

ALASKA DISCOVERY LESSON

**Animal adaptations to winter in Alaska
Lesson 2: How do animals stay warm?**

Developer's Name: David Runfola

Check all subject areas your lesson addresses.

Life Sciences Physical Sciences Mathematics Earth Sciences

Other (please specify) _____

Select all grades / educational levels that apply to this lesson:

K 1st 2nd 3rd 4th 5th 6th 7th 8th

What is the objective of this Alaska Discovery Lesson?

All animals have the same basic needs for survival.

Different animals found in Alaska's habitats have different special adaptations which help them survive in the cold.

Enter keywords that others can use to find your lesson in the TASK database.

Use commas between keywords.

adaptation, burrow, camouflage, habitat, insulation, snowshoes, winter survival

Duration of lesson: hours minutes

What background or foundational information will a teacher need to have prior to this lesson?

The teacher needs to have a knowledge of the role of habitats in determining what kinds of animals are found there and why. The teacher also needs to understand basic concepts of animals' adaptations to cold weather and snow.

How does the lesson address/follow the learning cycle model?

This lesson addresses the *Ask, Investigate, Discuss, and Reflect* steps of the Learning Cycle Model.

List the Grade Level Expectation(s) from the June 2005 Alaska Content Standards addressed by this lesson.

Alaska Science Standards, Grade Level Expectation S.A. 3.1: "The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by observing local conditions that determine which plants and/or animals survive."

How are School District curriculum guidelines addressed by this lesson? not applicable

How does this lesson pertain to Alaska issues?

Students are naturally very inquisitive about their surroundings and perceptive of different qualities they observe in the natural world. Most will have noticed different qualities that distinguish animals found in Alaska. However, many will still be developing their understanding of why these differences exist. They may question why some animals have lots of fur and others do not, or why some animals change color and others do not. This unit will help students understand why adaptations to the cold vary among different Alaskan animals, as well as how these adaptations can help an animal survive the winter in the arctic and subarctic.

List the supplies, materials and/or equipment needed to complete this lesson (consider consumables, non-consumables, locations, etc.)

Habitat Game

Activity 1:

small potatoes
small sealable containers
microwave
snow outdoors

Activity 2:

shortening
polyester fill or similar insulating material
Ziploc bags
buckets of cold water
examination gloves

LESSON

An essential part of learning about biological systems is understanding plant and animal adaptations to local environments. By learning about plant and animal adaptations, students will develop their knowledge of the fundamental concepts of ecology and evolutionary biology. These two fields of scientific inquiry are the foundation of humans' understanding of all biological systems.

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This unit is comprised of four lessons. The first lesson introduces the concept of animals' relationships to their habitats. The second lesson helps students understand how different kinds of natural insulation can help an animal stay warm in winter. The third lesson demonstrates how animal bodies have adapted to winter to help them hide from predators and move around in the snow more easily. The fourth lesson guides the students in synthesizing these concepts by giving them an opportunity to build their own animal that will survive an Alaskan winter.

Target Concepts

1. All animals have the same basic needs for survival.
2. Different animals found in Alaska's habitats have different special adaptations which help them survive in the cold.

Vocabulary

adaptation
burrow
camouflage
habitat
insulation
predator
prey

Materials

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Gear-up

Discuss previous lesson's final question: If a habitat is very cold, what adaptations will an animal need to stay warm? Have students explain their answers. Brainstorm about the different kinds of adaptations animals will have to keep themselves warm. Direct them to insulation and burrowing. Play a short round of the Habitat Game. Take note of students' changes in their animal-habitat associations. Ask students to discuss briefly their selections.

Explore

Activity 1: Burrowing

Warm up several small potatoes in a microwave until they are almost hot to the touch. Organize students into groups of two or three. Give each group two potatoes and two sealable containers. Have them observe how warm the potatoes are. Place one warm potato into each container. Bring students outside. Have each group place one container with a potato on top of the snow, and bury the other underneath a layer of snow several inches deep. Return to the classroom. After a few minutes retrieve the containers and return to the classroom. Have the students record their observations.

Activity 2: Insulation

Place buckets of ice water on tables around the room. At each bucket have exam gloves and two Ziploc bags. Fill one Ziploc bag with shortening and the other with polyester fill. Have students put on exam gloves. Have students place a gloved hand into the ice water. Then have them place a gloved hand into the shortening. Help them place their hand into the ice water with the Ziploc bag of shortening completely surrounding their gloved hand. Do the same with the Ziploc bag of polyester fill.

Generalize

Activity 1: Burrowing

Discuss the students' observations. Have them ask questions they might have about differences in temperature between the potato above the snow and the potato below. Ask them if they can explain what happened. Ask them to share their own experiences playing in deep snow on a cold day. How might animals living outside use snow to help them survive?

Activity 2: Insulation

Discuss the students' observations. Have them ask questions about these observations. Which hand was warmest? Which hand was coldest? Why? Discuss how some animals use fat (like shortening) to stay warm and others use fur. Many animals use both. Ask them to name animals that use fat, fur, or both to stay warm. Challenge them to consider different animals that may not be so obvious: voles and lemmings, birds (feathers are like fur), wood frogs (freeze solid), insects (antifreeze), etc.

Ask students to complete their learning logs.

Reflect

At the end of class ask students the following question: If a habitat has lots of snow on the ground, how will animals be able to get around? Instruct the students not to answer right away but to reflect on the question so they can discuss their answer during the next class.

Resources / Contacts / More Information

Credits & Acknowledgements

Douglas Schamel, Ph.D. (deceased, University of Alaska Fairbanks, Department of Biology and Wildlife)

Michelle Eickholt (University of Alaska Fairbanks, School of Education)

List files for upload (complete lesson plan, presentation, worksheet, data file, or other document files), and/or submit CD or disk containing the files with this Alaska Discovery Lesson.